

Science Draft Core Standards 2008-2009 Vermont Alternate Assessment

There are two prioritized Core Standards proposed for science for the Vermont Alternate Assessment (AA): Core Standard #1- Science Content Knowledge, and Core Standard #2 - Science Inquiry & Investigation. Science Content Knowledge is comprised of three subparts (A, B,C) that correspond with the science strands assessed in the New England Common Assessment Program (NECAP) at grades 4, 8, and 11. Alternate assessment science portfolios are developed during grades 4, 7, and 10 to match this instruction and assessment cycle. Each of the content knowledge Core Standards identifies a number of *instructional focus* areas for educators to further prioritize the student learning objectives for the content area. The instructional focus areas are translated into *learning progressions* of successively more complex knowledge and skill targets across the three designated grade spans (Elementary 2-5; Middle 6-8; High 9-12).

Core Standard #2, Science Inquiry & Investigation, is comprised of four subparts (A, B, C, D) that correspond with the inquiry/investigation strands assessed in the science NECAP. These are the science **Alternate Assessment Grade Cluster Expectations (AA GCE)** from which educational teams must select specific learning targets for instruction and assessment. The content knowledge domains of life, physical, and earth/space science are taught and assessed within the context of science investigation.

Core Standards for Science

1. Science Content Knowledge

- A. Life Science Concepts
- B. Physical Science Concepts
- C. Earth & Space Science Concepts

2. Science Inquiry & Investigation

- A. Formulating Questions & Hypothesizing
- B. Planning & Critiquing Investigations
- C. Conducting Investigations
- D. Developing & Evaluating Explanations

The **Science Content Knowledge Core Standard** and strands represent reduced breadth and depth compared to the grade-level content grade expectations (GE). Science content included for the alternate assessment has been prioritized to include those science concepts that are best learned through direct experience, investigation, and exploration. To the degree possible, this learning should occur in the context of the general education curriculum/classroom. The *Vermont Framework of Standards* Grade Expectations document for Science is a valuable resource to teachers for identifying the essence of each science concept when planning instruction for students taking the alternate assessment.

The **Science Inquiry & Investigation Core Standard** includes the four broad areas of inquiry assessed with the NECAP. Inquiry skills are intended to be taught and assessed within the context of the three science content domains. Central to all scientific inquiry is the ability to see differences. Being able to distinguish differences in observable properties and events is a precursor – or a foundational skill - to the ability to make observations; organize, sort, and classify data; make predictions about what might change or what might not change; and summarize or make conclusions about what happened.

“Investigates” is used in several AA GE and is intended to include a variety of learning experiences, such as participating in hands-on investigations with peers, manipulating objects and materials to “see what happens,” and observing demonstrations by adults or peers. For example, “investigate local ecosystems” appears at all grade levels; yet the focus of learning about ecosystems each year will be/should be different.

While science instruction will occur at all grade levels, **science will be assessed with the alternate assessment at grades 4, 7, and 10.** Within each grade span, special educators should collaborate with general education teachers to determine which learning opportunities in science are accessible to students with significant cognitive disabilities *within the context of the class curriculum*. For example, a fourth grade class may be studying earth materials to learn about differences between soils and rocks. *All* students could participate in a local field trip to collect and later sort and describe soil and rock samples. Collaborations between general education and special education staff also ensure that the science content and contexts are age-appropriate for the students taking the alternate assessment. Sorting *blocks* at grade four would not be age appropriate; sorting *rocks* at grade four, based on physical characteristics and properties would be age-appropriate.

For science, teachers must address both science core standards with the alternate assessment. While both science content knowledge and inquiry are important, the assessment focuses on student achievement in the investigation and inquiry processes -thinking and acting like a scientist. Science instruction must address all three content domains in science (Life Science, Physical Science, and Earth & Space Science) within and across grade levels. However, for the purposes of the alternate assessment, three (3) Inquiry & Investigations covering any two (2) of the science domains is required. Collaborations and planning between the general education and special education teachers will be essential in identifying and integrating the content domains and inquiry investigations that students can participate in with their classroom peers.

Because science is assessed only in benchmark years (4, 7, and 10), teams may compile evidence from the preceding year in the alternate assessment portfolio submission. This means that the grade 4 portfolio may include investigations from grades 3 and 4; the grade 7 portfolio may include evidence of science investigations conducted during grades 6 and 7; and the grade 10 portfolio may include evidence of science investigations from grades 9 and 10.

A science assessment plan for the 2008-2009 school year is provided on the following page. In selecting the appropriate Science Core Standards and AA GE to assess for each student, teachers should begin with skills closest to the student’s grade level GE. Evidence for each of three (3) investigations will include:

- **Participation:** Documentation of how the student participated with raising questions, hypothesizing, and planning the investigation (e.g., participated in teacher-guided class development of steps for investigation, practiced using data collection tools, generated questions and ideas with the class, etc.) In many cases, this inquiry element may have to be heavily scaffolded by teachers.
- **Data Collection:** Evidence of how the student conducted the investigation (e.g., completed data collection sheet, labeled diagrams). These skills and data sets may also be coordinated with the mathematics strand of Data, Statistics, & Probability.
- **Communication of Results:** Evidence of how the student shared findings (e.g., summarized results, compared results to others, drew conclusions, and supported them with data).

What the Grade-by-Grade Alternate Assessment Portfolio Plan <i>Could Look Like</i> for Science for the 2008-2009 School Year					
Grade Levels	(#2) Science Inquiry & Investigation				(#1) Science Content Knowledge
	A. Formulating Questions & Hypothesizing	B. Planning & Critiquing Investigations	C. Conducting Investigations	D. Developing & Evaluating Explanations	Life Science Physical science Earth & Space Science
Grade 2	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 3	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 4	Document how the student participated	Document how the student participated	Required (corresponds with mathematics data strand*)	Required	Include at least 2 domains of science
Grade 5	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 6	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 7	Document how the student participated	Document how the student participated	Required (corresponds with mathematics data strand*)	Required	Include at least 2 domains of science
Grade 8	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 9	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 10	Document how the student participated	Document how the student participated	Required (corresponds with mathematics data strand*)	Required	Include at least 2 domains of science
Grade 11	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction
Grade 12	Include for instruction	Include for instruction	Include for instruction	Include for instruction	Include for instruction

* Since data will be collected during science investigations, in most cases the mathematics data strand can be applied to science content.

AA Core Standards Science Content	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
1. Content Knowledge: Part A. Life Science <i>Essence:</i> All living organisms have structures and behaviors that help them to survive. Habitats and the living things within them provide organisms with what they need to survive. All living things have life cycles, but they are different for different organisms. Offspring inherit traits from their parents. <i>Some Essential Questions for Instruction:</i> What do plants and animals need to survive? How are living things interdependent with each other? What is a habitat and how does a habitat provide what an organism needs to survive?	S30 S31 S34 S35 S36 S37 S38 S40 S41 S42 S43	A. Life Science Investigates topics such as: plants, animals, habitats, food webs, classification of living things, interdependence in ecosystems, life cycles and reproduction, survival, body systems, human health & disease, patterns of human development, heredity Builds personal word bank (e.g., descriptive words, subject specific words) Relates new meanings to prior knowledge and applies new vocabulary in science activities Talks about/shares ideas about life science concepts Listens to/responds to print and non-print texts & observations of life science concepts	1.e Generalizes use of pictures, symbols, objects, and actions to identify consistent meanings 2e. Responds to basic questions about topic (what, where, why, how) 3e. Observes, records, and describes what plants need to live and grow (e.g., water, food, light, air) 4e. Recognizes differences between living and nonliving things (e.g., sand can't grow) 5e. Investigates local ecosystems 6e. Recognizes or identifies structures of plants (e.g., roots, stems, leaves, seeds, flowers) 8e. Recognizes or identifies structures of animals (e.g., legs, wings, tail, beak, claws) 10e. Sorts/classifies living things by physical characteristics	2m. Responds to questions about topic (what, where, why, how) 3m. Observes, records, and describes what plants <u>or animals</u> need to live 5m. Investigates local ecosystems 6m. Identifies structures of plants (e.g., roots, stems, leaves, seeds, flowers) 7m. <u>Predicts and investigates what might happen to a plant if a change is made to the environment (e.g., water, soil type light, heat)</u> 8m. Identifies structures of animals (e.g., legs, wings, tail, beak, claws) 9m. <u>Identifies external structures (e.g., arms, legs) and internal structures (e.g., bones, lungs, heart) of humans</u> 10m. Sorts or classifies livings by their physical characteristics	3h. Responds to questions about topic (what, where, why, how) 3h. Observes, records, and describes what plants or animals need to live 5h. Investigates local ecosystems 7h. Predicts and investigates what might happen to a plant if a change is made to the environment (e.g., water, soil type, light, heat) 9h. <u>Identifies or explains what internal structures do for the human body (e.g., heart pumps blood, muscles help you move)</u> 10h. Sorts or classifies livings by their physical characteristics

<p>Are all habitats alike?</p> <p>What can we find in a local ecosystem?</p> <p>What happens to the organisms when something in the habitat changes? (e.g., not enough food, new predator, human pollution)</p> <p>What happens to plants and animals when they die? How does our recycling help the environment?</p> <p>Why do offspring look like their parents?</p>			<p>11e. Matches structures of plants or animals with how they are used (e.g., legs and wings help them move)</p> <p>12e. Show a simple sequence of plant life cycles (draw, label, arrange picture or objects)</p> <p>13e. Describes, matches, or creates (draw, build) what's needed in a habitat (land or water) for a given organism</p> <p>14e. Recognizes that all animals depend on plants in some way (some eat plants, some eat animals that eat plants)</p> <p>15e. Recognizes or identifies physical features of humans that are inherited from parents (e.g., hair color, height, eye color, skin color, curly or straight hair)</p> <p>16e. Recognizes or identifies the "potential" offspring for given parents (e.g., same type of dog; same color markings on bird)</p> <p>17e. Recognizes or identifies ways to keep the body healthy (e.g., wash hands, eat healthy snacks, don't taste things that you don't know)</p> <p>18e. Identifies the five senses</p>	<p>11m. Identifies or matches structures of plants or animals with how they are <u>used for survival</u> (e.g., talons help hawks catch food; roots bring in water)</p> <p>12m. Shows a sequence of plant <u>or animal (including human)</u> life cycles (draw, label, arrange picture or objects)</p> <p>13m. Describes or creates a habitat for a given organism</p> <p>14m. Organizes a familiar food chain that links plants and animals (e.g., corn seeds, mouse, cat)</p> <p>15m. Identifies <u>or compare</u> physical features of <u>organisms</u> that are inherited from parents (e.g., hair color, height, eye color, skin color, curly or straight hair)</p> <p>16m. Identifies the "potential" offspring for given parents (e.g., same type or color of dog, same type, size, or color of flower)</p> <p>17m. Identifies or explains <u>behaviors that help us to survive/stay healthy</u></p> <p>18m. Identifies the five senses <u>and use them to make observations and predictions</u></p>	<p>11h. Identifies or matches structures of plants or animals with how they are used for survival (e.g., talons help hawks catch food; roots bring in water)</p> <p>12h. Shows a sequence of plant or animal (including human) life cycles (draw, label, arrange picture or objects)</p> <p>13h. <u>Compares an aquatic habitat to terrestrial habitat, including the animals that live in each environment</u></p> <p>14h. Organizes a <u>familiar food web (e.g., seed pods from plants, small birds and squirrels eat seeds, hawk or cat hunts birds and squirrels) to explain ways organisms depend on each other</u></p> <p>15h. Identifies or compares physical features of organisms that are inherited from parents</p> <p>17h. <u>Matches or explains appropriate treatments & healthy behaviors with health-related situations (e.g., band aide for cut, aspirin for headache; cleaning a cut)</u></p> <p>18h. <u>Observe plant or animal cells under a microscope to see/ describe that there are smaller parts of cells</u></p>
--	--	--	---	---	--

AA Core Standards Science Content	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
1. Content Knowledge: Part B. Physical Science <i>Essence:</i> Solids, liquids, & gases have characteristic properties that can be observed, and used to identify or compare substances. All matter – even air - has weight and takes up space. Most objects/ substances are made of smaller parts. Forces (push-pull) can change the motion of objects and that motion and the position of objects can be described & measured. Energy is needed to change states of matter (solid to liquid) and is used to make many things we use work. <i>Some Essential Questions for Instruction:</i>	S9 S10 S12 S14 S15 S19 S21 S23 S24 S25 S28 S29	Physical Science Investigates topics such as: properties of matter, physical & chemical changes, forces & motion, energy (heat, electrical, magnetism, light, sound) Builds personal word bank (e.g., descriptive words, subject specific words) Relates new meanings to prior knowledge and applies new vocabulary in science activities Talks about/shares ideas about physical science concepts Listens to/responds to print and non-print texts & observations of physical science concepts	1e. Generalizes use of pictures, symbols, objects, and actions to identify consistent meanings 2e. Responds to basic questions about topic (what, where, why, how) 3e. Recognizes properties of solids and liquids 4e. Identifies water in its liquid and solid forms 5e. Observes and sorts substances that are solids and liquids 6e. Observes and identifies properties of common objects or materials 7e. Investigates what happens to liquids or solids when heat is applied (e.g., liquid in an open container turns to gas/ evaporates; ice melts) 9e. Manipulates objects and observes and describes the motion of objects (e.g., fast-slow, straight, zig-zag)	2m. Responds to questions about topic (what, where, why, how) 3m. <u>Observes, describes, and compares</u> properties of solids, liquids, <u>and gases</u> 4m. Identifies water in its liquid, solid, <u>& gas</u> forms 5m. Identifies differences between solids and liquids 6m. <u>Compares</u> properties of common objects or materials 7m. <u>Observes and predicts effects of heating or cooling (e.g., apply heat to ice or water; freezing water)</u> 8m. <u>Observe and describe simple chemical changes that produce new substances (e.g., rust; vinegar + baking soda; burning)</u> 9m. Manipulates objects and observes, describes, <u>and compares</u> the motion (e.g., fast-slow, straight, zig-zag,) and position of objects	3h. Responds to questions about topic (what, where, why, how) 3h. Observes, describes, and compares properties of solids, liquids, and gases 6h. <u>Distinguishes one substance from another using observable physical properties (e.g., density, melting point, conductivity) or chemical properties (e.g., reactivity with water or vinegar)</u> 7h. Observes and predicts effects of changing temperature <u>or</u> pressure (e.g., <u>blowing up a balloon adds pressure in all directions and changes the size of the balloon</u>) 8h. Observe and <u>predict</u> simple chemical changes that produce new substances (e.g., rust; vinegar + baking soda; burning)

<p>Does all matter (solids, liquids, gases) have weight?</p> <p>How are objects and materials alike and how are they different?</p> <p>What is a force? How do forces affect motion of objects?</p> <p>What is energy? How do we use energy?</p>			<p>10e. Investigates how different amounts of force (push-pull) affect speed or direction of objects</p> <p>12e. Recognize or identify sources of energy in the real world (e.g., sun, light, heat, magnets, sound, food)</p> <p>13e. Identifies common objects that use various forms of energy (e.g., electricity for common appliances, food for us)</p> <p>15e. Observes, describes, and compares (by sorting or explaining) how magnets interact with objects (e.g., attract, poles repel, make things move)</p>	<p>10m. <u>Uses observations to predict how speed or direction of objects is affected under certain conditions (e.g., steeper ramp, more weight, more or less force)</u></p> <p>11m. <u>Measures to show how the total weight of parts of a substance, no matter how combined, remains the same (e.g., water + gravel, water + sugar)</u></p> <p>12m. Investigates forms of energy – sound, <u>light (e.g., reflected or absorbed by objects)</u>, or heat</p> <p>13m. <u>Matches common objects with the forms of energy they use (e.g., electricity for common appliances, food for us, wind for windmills, light for plants)</u></p> <p>14m. <u>Investigates forms of electrical energy (e.g., static electricity, simple circuits, electro magnets)</u></p>	<p>10h. <u>Predicts, measures, calculates, or compares the distance or speed of objects in motion (e.g., how far toy car traveled; which car travels faster)</u></p> <p>11h. Measures to show how the total weight of parts of a substance, no matter how combined, remains the same (e.g., water + gravel = water plus gravel; water + sugar = sugar dissolved in water)</p> <p>14h. Investigates forms of electrical energy (e.g., static electricity, simple circuits, electro magnets, <u>motors and batteries in toys</u>)</p>
--	--	--	---	--	--

AA Core Standards Science Content	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
1. Content Knowledge: Part C: Earth & Space Science Essence:: Locations and movements of objects in the sky and changes in the weather, atmosphere, seasons, and land forms can be observed, described, compared, and predicted. The sun is a star that provides heat and light needed to maintain temperature on the earth. Natural resources are living (plants & animals) and nonliving (water, rocks, soils, metals, etc.) materials that we get from the environment. Four basic earth materials are rocks, soils, water, and gases/air. Some Essential Questions for Instruction: Why does the weather change?	S44 S45 S46 S47 S48 S49	Earth & Space Investigates topics such as: objects in the sky, earth materials and rock cycle, earth processes: forces and change on Earth's surface (e.g., weathering, erosion, volcanoes), atmosphere, weather, seasons, water cycle, and natural resources Builds personal word bank (e.g., descriptive words, subject specific words) Relates new meanings to prior knowledge and applies new vocabulary in science activities Talks about/shares ideas about earth & space science concepts Listens to/responds to print and non-print texts & observations of physical science concepts	1e. <i>Generalizes</i> use of pictures, symbols, objects, and actions to identify consistent meanings 2e. Responds to basic questions about topic (what, where, why, how) 3e. Observes, records, and describes objects in the day and night sky 4e. Collects and describes local samples of earth materials 5e. Observes, records, and describes changes in the weather 6e. Observes, records, and describes changes in the seasons 8e. Investigates what happens to water on the earth when sun's heat is applied (e.g., liquid in an open container turns to gas/ evaporates)	2m. Responds to questions about topic (what, where, why, how) 3m. Compares the day and night sky and recognizes similarities (clouds, moon sometimes both) and differences (sun in day, stars at night) 4m. <u>Compares and orders</u> earth materials (soils, rocks, etc) by their physical characteristics (e.g., <u>hardness of rocks</u> , color, <u>sizes of boulder to rock to sand grains</u> , textures of soils) 5m. Observes, records, and describes <u>patterns</u> in the weather 6m. Observes, records, describes, <u>and compares</u> changes in the seasons 7m. Investigates how water or wind reshapes the earth's land surface (erosion and sedimentation) 8m. <u>Observes effects of heating water (to form a cloud) and cooling water vapor in the atmosphere (to make rain) and shows cause-effect sequence (water cycle)</u> 9m. <u>Identifies living things in</u>	2h. Responds to questions about topic (what, where, why, how) 3h. <u>Observes and identifies patterns of movement of objects in the sky</u> 4h. Investigates contextual differences and correlations in soils and rocks (e.g., which holds more water, which is best for desert plants) 7h. <u>Uses physical models to show or explain how Earth's surface can be changed (e.g., wind or water erosion, sedimentation, earthquake, volcano)</u> 8h. Observes effects of heating water (to form a cloud) and cooling water vapor in the atmosphere (to make rain) and shows cause-effect sequence (water cycle) 9h. Identifies living things in

<p>How are rocks and soils formed?</p> <p>How are rocks and soils alike and different?</p> <p>What makes it rain?</p> <p>What happens to make changes in the land's surface?</p> <p>What are natural resources and how can we take care of them?</p>				<p><u>the environment used by people (e.g., foods, firewood, lumber, paper, syrup)</u></p>	<p>the environment used by people (e.g., foods, firewood, lumber, paper, syrup) <u>and nonliving things in the environment used by people (e.g., water, air, stone, metals)</u></p> <p>10h. <u>Recognizes or matches ways to protect natural resources with appropriate management (e.g., don't pollute water or fish will die and people can't drink it; use fertilizer so plants will grow; plant more trees when you cut them down for lumber)</u></p>
--	--	--	--	--	--

AA Core Standards Science Inquiry	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
<p>2. Inquiry & Investigation:</p> <p>Part A. Formulating Questions & Hypothesizing</p> <p><i>Essence:</i> Questioning and observing develops an awareness and curiosity about objects, organisms, and events in the environment.</p> <p><i>Some Essential Questions for Instruction:</i> What can we learn from observing?</p> <p>What do we want to find out? Can we use an investigation to answer this question?</p> <p>What do we think will happen? What is our prediction?</p> <p>Why do we think that might happen?</p>	<p>S1</p> <p>S2</p>	<p>Formulating Questions & Hypothesizing</p> <p>Sustains curiosity and focus during teacher-guided explorations, open-ended, & self-guided explorations</p> <p>Answers questions about things observed, manipulated, or predicted</p> <p>Uses picture cues, prior knowledge, and observations to make predictions</p> <p>Formulates questions about things observed or manipulated when cued (e.g., what do you wonder?) or on own</p> <p>Makes personal connections to ideas presented or observed</p>	<p>1e. Recognizes a plausible question about things observed or manipulated that can be tested with investigation (e.g., will it float; will it be attracted to the magnet)</p> <p>2e. Connects prior knowledge/evidence to observation</p> <p>3e. Identifies a variable to test (e.g., what will happen if the plant gets more water?)</p> <p>4e. Recognizes or identifies a plausible prediction (e.g., it could sink; the plant could die)</p>	<p>1m. Recognizes or <u>formulates</u> a question about things observed or manipulated that can be tested with investigation (e.g., will it grow taller with more water, more light)</p> <p>2m. Connects prior knowledge/evidence to observations <u>or predictions</u></p> <p>3m. Identifies possible variables to test (e.g., what will happen if the plant gets more water?)</p> <p>4m. Recognizes or identifies a plausible prediction</p> <p>5m. <u>Recognizes or identifies a plausible cause-effect relationship (e.g., it will sink if it's heavy like the rock)</u></p> <p>6m. <u>Generates a new question or prediction to test after an investigation (e.g., what else do I want to try?)</u></p>	<p>1h. Recognizes or formulates a question about things observed or manipulated that can be tested with investigation</p> <p>2h. Connects prior knowledge/evidence to observations or predictions</p> <p>3h. Identifies possible variables to test (e.g., what will happen if the plant gets more water?)</p> <p>4h. Recognizes or identifies a plausible prediction</p> <p>5h. <u>Identifies a cause-effect relationship in prediction (e.g., if plants need light to live, then if no light means the plant will die)</u></p> <p>6h. <u>Supports or explains a prediction</u> Generates a new question or prediction to test after an investigation (e.g., what else do I want to try?)</p>

AA Core Standards Science Inquiry	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
<p>2. Inquiry & Investigation:</p> <p>Part B. Planning & Critiquing Investigations</p> <p><i>Essence:</i> Following a plan and carefully collecting data and safely tools is how scientists test their predictions or answer testable questions.</p> <p><i>Some Essential Questions for Instruction:</i> How can we answer our questions about materials and the environment using an investigation?</p> <p>What steps will use to answer our questions?</p> <p>How do we make a test “fair” when we investigate?</p>	S3	<p>Planning & Critiquing Investigations</p> <p>Works with others to generate testable questions</p> <p>Works with others to develop key steps to collect & record data</p> <p>Identifies appropriate tools (e.g., ruler, balance scale, thermometer, hand lens) for data collection and demonstrates how to use them</p> <p>Practices following simple directions and completing recording sheets for observations (e.g., counting and filling in bar graph, labeling drawing or diagram, moving pictures into spaces provided)</p>	<p>1e. Recognizes or identifies potential data to collect and tools & materials needed</p> <p>2e. Identifies or makes a simple plan to answer observational questions</p> <p>3e. Identifies or explains safety rules for data collection (e.g., do not taste when using senses to observe)</p> <p>4e. Recognizes correct sequences of key steps in an investigation</p>	<p>1m. Identifies potential data to collect and tools & materials needed</p> <p>2m. Identifies or makes a simple plan to answer observational questions</p> <p>3m. Identifies or explains safety rules for data collection (e.g., wear safety goggles to protect eyes)</p> <p>4m. <u>Sequences key steps in a science procedure</u></p> <p>5m. <u>Uses transitional words/phrases appropriately in planning steps of the investigation (e.g., first, next; before-after)</u></p>	<p>1h. Identifies potential data to collect and tools & materials needed</p> <p>2h. Identifies or makes a <u>step-by-step plan</u> to answer observational questions</p> <p>3h. Identifies or explains safety rules for data collection (e.g., wear safety goggles to protect eyes)</p> <p>4h. Sequences key steps in a science procedure</p> <p>5h. Uses transitional words/phrases appropriately in planning steps of the investigation (e.g., first, next; before; <u>because, if-then</u>)</p> <p>6h. <u>Recognizes or explains why a procedure is/ is not a “fair test” (e.g., control of variables, multiple trials, data collection method – count or measure the same way each time)</u></p>

AA Core Standards Science Inquiry	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
2. Inquiry & Investigation: Part C. Conducting Investigations <i>Essence:</i> The skills of observing, measuring, recording, organizing, and summarizing data can be used to answer questions about the natural world. Following a plan and carefully collecting the data will make the investigation a “fair test.” <i>Some Essential Questions for Instruction:</i> What is data? What tools and rules do we have for collecting data and recoding? What are the safety rules we need to follow?	S4	Conducting Investigations	1e. Follows steps of a plan to conduct investigations 2e. Uses tools & senses to make observations and collect data 3e. Records data (e.g., drawing, speaking, selecting from word bank, marking table) 4e. Organizes observations (e.g., drawings have labels; uses T-chart provided to sort by given categories or observable features) 5e. Sorts by categories or observable features 6e. Records ‘targeted’ feature(s) from observations (e.g., size, color, shape, numbers) 7e. Recognizes, describes or summarizes what was done or what happened	1m. Follows steps of a plan to conduct investigations 2m. Uses tools & senses to make observations and collect data 3m. Records data (e.g., drawing, speaking, selecting from word bank, marking table) 4m. Organizes observations in charts/ tables/ forms provided (e.g., T-chart, <u>pictograph</u> , <u>bar graph</u> , <u>line graph</u>) 5m. Sorts by categories, observable features, <u>or functions</u> 6m. Records ‘targeted’ feature(s) from observations (e.g., size, color, shape, numbers) <u>with some detail (e.g., size, relative proportion, order)</u> 7m. Recognizes, describes or summarizes what was done or what happened	1h. Follows steps of a plan to conduct investigations 2h. Uses tools <u>correctly and accurately</u> to make observations and collect data (e.g., measures accurately) 3h. Records <u>all</u> data (e.g., drawing, speaking, selecting from word bank, marking table) 4h. Organizes observations in charts/ tables/ forms provided (e.g., T-chart, pictograph, bar graph, line graph) 5h. Sorts by categories, observable features, or functions 6h. Records ‘targeted’ feature(s) from observations (e.g., size, color, shape, numbers) with some detail (e.g., size, relative proportion, order, <u>scale or key</u>) 7h. Recognizes, describes or summarizes what was done or what happened
	S5	Follows a plan with several steps to answer a testable question (e.g., will it sink or float?) Uses multiple senses and tools to collect data and make observations Checks for accuracy in measuring, observing, and recording Records data in teacher-provided tables/ charts/ templates Demonstrates understanding of safety rules when investigating (e.g., wears goggles, does not put into mouth, washes hands after handling materials, etc.)			

AA Core Standards Science Inquiry	VT GE	Instructional Focus	Elementary (2-5) AA Grade Cluster Expectations	Middle (6-8) AA Grade Cluster Expectations	High (9-12) AA Grade Cluster Expectations
2. Inquiry & Investigation: Part D. Developing & Evaluating Explanations <i>Essence:</i> The information and/or data collected during an investigation can be used to summarize what happened, to support ideas and conclusions, and to communicate what was learned. <i>Some Essential Questions for Instruction:</i> How can we share what we did and what happened so others will understand us? What did we learn? What do we still want to know? What evidence supports our conclusions?	S6 S7 S8	Developing & Evaluating Explanations Organizes information for intended meaning Shares ideas with others Communicates on a given topic, observation, idea, or experience using scaffolding provided (e.g., cueing, pictures, symbols, objects) Responds in a variety of forms (e.g., speaking, writing, drawing, pictures in a sequence)	1e. Communicates a sequence followed (e.g., steps in science procedure) or description with scaffolding (e.g., teacher-provided recording template) 2e. Identifies or communicates to describe what happened or what was learned 3e. Describes similarities and differences	1m. Communicates a sequence followed (e.g., steps in science procedure) or description with scaffolding (e.g., teacher-provided recording template) 2m. Identifies or writes/communicates to describe what happened or what was learned 3m. <u>Compares-contrasts if appropriate</u> 4m. <u>Uses transitional words/phrases appropriately in describing steps of the investigation (e.g., first, next; before-after)</u> 5m. <u>Summarizes key ideas</u> <u>Uses some supporting details (e.g., filled in diagram, drawing) to communicate results</u>	1h. Communicates a sequence followed (e.g., steps in science procedure) or description with scaffolding (e.g., teacher-provided recording template) 2h. Identifies or writes/communicates <u>complete sentences</u> to describe what happened or what was learned 3h. Compares-contrasts if appropriate 4h. Uses transitional words/phrases appropriately in describing steps of the investigation (e.g., first, next; before; <u>because, if-then</u>) 5h. Summarizes key ideas Uses supporting details, <u>examples, or evidence</u> , with scaffolding support (e.g., filled in diagram, drawing) to communicate results <u>or draw conclusions</u> 6h. <u>Explains cause-effect</u> (e.g., result of observation or science investigation)